Jonathan H. Drucker, Ph.D.
jondrucker86@gmail.com
(813) 766-0527

Current as of:

March 5, 2024

NON-ACADEMIC RESEARCH & CONSULTING

February 2024 – Current
Self-employed: HumanNexus Neuroscience Consulting, LLC
Philadelphia, PA

- Experimental design
- Hardware and software analysis of alternatives
- Data analysis
- Proposal generation

April 2020 – February 2024
Neuroscientist: Aptima Inc.
Philadelphia, PA

- Lead scientific and technical work regarding neuroscience and human factors
- Developed and maintained relationships with key current and future stakeholders
- Conducted statistical analyses of multimodal neuro-physioloigical data
- Implemented machine learning models of neuro-physiological data
- Led the production of technical reports, proposals, and published papers

September 2016 - April 2020
Scientific Consultant: Brain Vision LLC
Morrisville, NC

- *Consulting*: discussed theory, hypotheses, experimental design, and methodologies with users in neuroscience, psychology, and other fields
- *Subject Matter Expert*: EEG, TMS, tDCS/tACS, fNIRS, fMRI, Source Localization
- *Sales*: generated leads, facilitated sales, coordinated purchasing and invoicing, managed customer and vendor relationships
- *User Training*: installed hardware and software onsite, instructed labs virtually and in-person on the use of hardware and software for electroencephalography (EEG), functional near-infrared spectroscopy (fNIRS), transcranial electrical stimulation (tES/tDCS/tACS), and transcranial magnetic stimulation (TMS). Total: 28 onsite visits
- *Support*: assisted users with hardware and software issues, advised on best practices
- *Outreach*: attended conferences and conducted demonstrations and workshops. Total: 26 conferences and 29 demonstrations/workshops

ACADEMIC RESEARCH

May 2015 - August 2016
Postdoctoral Research Associate: Emory University, Department of Neurology; Atlanta VAMC, Center for Visual & Neurocognitive Rehabilitation
Atlanta, GA

- Principal Investigator: Bruce Crosson, Ph.D.
- Continuation and extension of pre-doctoral appointment

- Designed, executed, and analyzed experiments pertaining to two topics: 1) language in the aging brain, and 2) GABAergic contributions to language and motor function
- Neuroimaging analyst for lab group
- Methodologies: fMRI, DTI, MRS, rTMS, behavioral paradigms

May 2015 - August 2016
Postdoctoral Research Associate: Emory University, Department of Neurology; Atlanta VAMC, Center for Visual & Neurocognitive Rehabilitation
Atlanta, GA

- Principal Investigator: Madeleine Hackney, Ph.D.
- Analyzed experiments pertaining to neural and motor correlates of Parkinson's disease
- Analyzed neuroimaging and biomechanical data
- Methodologies: fMRI, dynamometry processing, neurocognitive testing for Parkinson's disease

May 2012 - May 2015
Predoctoral Research Associate: Emory University, Department of Neurology; Atlanta VAMC, Center for Visual & Neurocognitive Rehabilitation
Atlanta, GA

- Principal Investigator: Bruce Crosson, Ph.D.
- Executed and analyzed experiment pertaining to language in the aging brain
- Co-authored review paper on normal aging vs. disease state interaction in the human brain
- Methodologies: fMRI, rTMS, behavioral paradigms

September 2008 - May 2015
Graduate Student: Emory University, Department of Psychology
Atlanta, GA

- Principal Investigator: Lawrence W. Barsalou, Ph.D.
- Doctoral dissertation: *Neural bases of core & conceptual self: Implications for the representation of other persons and groups of people*
- Masters thesis: *Shared neural mechanisms of identity for self, other, and object*
- Designed, executed, and analyzed experiments pertaining to neurocognitive self-processing & psychophysical dynamics of perceptual processing
- Methodologies: fMRI, behavioral and psychophysical paradigms

September 2006 - June 2008
Research Assistant - Stanford University, Department of Psychology
Stanford, CA

- Principal Investigator: Anthony D. Wagner, Ph.D.
- Executed fMRI study of object memory in the human brain
- Analyzed behavioral data in MATLAB to create novel psychophysical stimulus set

January 2006 - June 2006
Research Assistant - Stanford University, Department of Psychology
Stanford, CA

- Principal Investigator: Michael Ramscar, Ph.D.
- Executed behavioral study of statistical learning in young children

Additional research collaborations

September 2013 - July 2014
Research collaboration - Emory University, Department of Psychology
Atlanta, GA

- Principal Investigator: Stella F. Lourenco, Ph.D.

- Designed, executed, and analyzed a psychophysical experiment on the perception of time
- Presented findings at 2014 Annual Meeting of the Cognitive Science Society

March 2012 - May 2014
Research collaboration - Georgia Institute of Technology, Department of Biomedical Engineering
Atlanta, GA

- Principal Investigator: Steven M. Potter, Ph.D.
- Plated and maintained neuronal cultures in vitro for electrical stimulation and electrophysiological recording
- Analyzed local field potential data in MATLAB to identify patterns of neural activity

EDUCATION

Ph.D., Emory University 2015	Psychology	advisor: Lawrence W. Barsalou
M.A., Emory University 2011	Psychology	advisor: Lawrence W. Barsalou
B.S., Stanford University 2008	Symbolic Systems	advisor: James L. McClelland

Other certifications
Project Management Professional (PMP), Project Management Institute 2021
Data Science Professional Certificate, IBM expected 2024

TEACHING

Guest Lecturer, Emory University, Graduate Division of Biological & Biomedical Sciences
Courses: Human Nutrition, 2014 & 2015

Instructor, Emory University, Department of Psychology
Courses: The Cognition of Stress, 2011

Teaching Associate, Emory University, Department of Psychology
Courses: Experimental Methods, 2010

Teaching Assistant, Emory University, Department of Psychology
Courses: Introduction to Statistical Inference, 2012
Applied Statistics for Psychology, 2009 & 2011

EXPERTISE

With respect to human cognitive neuroscience (academic research except where otherwise noted):

Functional Neuroimaging:
8 years research experience with magnetic resonance imaging (**fMRI**) and analysis.
Hardware: Trio & Prisma (Siemens)
Software: AFNI, FSL, ITK-SNAP

8 years industry experience with functional near-infrared spectroscopy (**fNIRS**).
Hardware: NIRScout & NIRSport (NIRx Medical Technologies), PLUX (PLUX Biosignals)
Software: NIRStim, NIRStar, nirsLAB, NIRSite (NIRx Medical Technologies); Python MNE

Methods: general linear model, independent components analysis, psychophysiological interaction, multivariate pattern analysis / linear classification, region of interest delineation

Non-invasive Brain Stimulation:

4 years research experience with repetitive transcranial magnetic stimulation (**rTMS**)
Software/Hardware: BrainSight for frameless stereotactic navigation (Rogue Research), MagPro for stimulation and EMG interpretation (MagVenture)
Methods: repetitive and single-pulse TMS, resting motor threshold (rMT) determination

2 years industry experience with transcranial electrical stimulation (**tES, tDCS, tACS**, etc.).
Hardware: NeuroMod (StimScience); various tES (1x1) and HD-tES (4x1) devices (Soterix Medical); DC-Stimulator (NeuroConn)

1 year industry experience with simultaneous **EEG-TMS**
Hardware: actiCAP, actiCHamp, & BrainAmp DC (Brain Products); MagStim; MagVenture

Electrophysiology (central):

8 years industry experience with electroencephalography (**EEG**), alone or simultaneous with fMRI or TMS
Hardware: BrainVision actiCAP, actiCHamp, BrainAmp Standard/DC/MR/MR Plus, V-Amp, LiveAmp, CapTrak (Brain Products); OpenBCI Cyton; ANT Neuro; Cognionics/CGK; Cogwear
S*oftware*: BrainVision Recorder & PyCorder, BrainVision Analyzer 2, BrainVision RecView (Brain Products); EEGLAB; BESA; OpenBCI; LabStreamingLayer; Python MNE

Methods: measurement and analysis of the EEG signal including ERP, ICA, frequency domain (FFT) and time-frequency domain (wavelet) analyses; electrode position digitization; MR gradient and cardioballistic artifact correction; TMS artifact mitigation; safety in an MR setting; source analysis via dipole modeling, LORETA

Electrophysiology (peripheral):

8 years experience with electromyography (**EMG**), complementary with TMS
Methods: measurement and analysis of TMS-evoked potentials, transcutaneous electrical stimulation as sham condition for TMS

Human Subjects Experimentation:

19+ years experience in behavioral psychological and psychophysical methods.
Software: E-Prime, PsychoPy, PRAAT (speech analysis), PyGame

Cognitive assessment: Unified Parkinson's disease rating scale (UPDRS, for PD assessment), Montreal Cognitive Assessment, California Verbal Learning Test, many others

Data Science & Statistical Analysis:

Software: Python (Pandas, NumPy, Scikit-Learn, PyTorch), R, SPSS, MATLAB, Excel, pencil & paper
Limited experience: TensorFlow

Computer Programming Languages:

Extensive experience: Python, Unix shell scripting (bash, csh, tcsh), MATLAB, R, ACT-R

Limited experience: C++, Java, Lisp

General:

Software: Excel, Word, PowerPoint, E-Prime, Audacity, Draw.io, Gimp
Communication: business development*, s*cientific writing, public speaking, pedagogy

FELLOWSHIPS

George W. Woodruff Fellowship, Laney Graduate School, Emory University, 2008-2013

AFFILIATIONS

Cognitive Neuroscience Society
Society for Neuroscience
Cognitive Science Society
Association for Psychological Science

FUNDING

DHA Phase I SBIR - W81XWH-22-P-0129 (PI) **2022-2023**
FRANC I: In-helmet, flight-ready EEG *$249,968*

AFWERX Phase II STTR - FA864922P0734 (PI) **2022-2023**
NeuroAdapt II: Brain-computer interface (BCI) to enhance training *$750,000*

NAWCAD Phase I SBIR - N683352200401 (PI) **2022-2023**
MAVIS I: Neuroscience of spatial disorientation in virtual reality *$139,969*

AFWERX Phase I STTR - FA864921P0735 (PI) **2021-2021**
NeuroAdapt I: BCI for air traffic control training enhancement *$50,000*

USSOCOM Phase II STTR H9240521C0004 (Key personnel) **2020-2022**
RESTORE II: Sleep assessment and restoration *$1,293,540*

USAMRDC Competition XTechBolt Round 1 (PI) **2020-2020**
BOLT BCI: BCI for air traffic control training enhancement *$10,000*

PEER-REVIEWED PUBLICATIONS

Erickson, I., Hidalgo, M., Reynolds, J., Krumholtz, V., Blacker, K., Burcal, C., Pettijohn, K., & **Drucker, J. H.** Proof-of-concept for a data-driven VR spatial disorientation training tool for Navy pilots. *67th Annual Meeting of the Human Factors and Ergonomics Society*. Washington, D.C., October 2023.

Quarmley, M., Zelinsky, G., Athar, S., Yang, Z., **Drucker, J. H.**, Samaras, D., & Jarcho, J. M. (2023). Nonverbal behavioral patterns predict social rejection elicited aggression. *Biological Psychology, 183*, 108670. https://doi.org/10.1016/j.biopsycho.2023.108670

Drucker, J. H., Epstein, C. M., McGregor, K. M., Hortman, K., Gopinath, K. S., & Crosson, B. (2022). Reduced Interference and Serial Dependency Effects for Naming in Older but Not Younger Adults after 1 Hz rTMS of Right Pars Triangularis. Neu*robiology of Language, 3*(2), 256-271. https://doi.org/10.1162/nol_a_00063

Krishnamurthy, L. C., Champion, G. N., McGregor, K. M., Krishnamurthy, V., Turabi, A., Roberts, S. R., Nocera, J. R., Borich, M. R., Rodriguez, A. D., Belagaje, S. R., Harrington, R. M., Harris-Love, M. L., Harnish, S. M., **Drucker, J. H.**, Benjamin, M., Meadows, M. L., Seeds, L., Zlatar, Z. Z., Sudhyadhom, A., … Crosson, B. A. (2020). The effect of time since stroke, gender, age, and lesion size on thalamus volume in chronic stroke: A pilot study. *Scientific Reports, 10*(1), 1-5. https://doi.org/10.1038/s41598-020-76382-x

Krishnamurthy V., Krishnamurthy L.C., **Drucker J.H.,** Kundu S., Ji B., Hortman K., Roberts S.R., Mammino K., Tran S.M., Gopinath K., McGregor K.M., Rodriguez A.D., Qiu D., Crosson B. & Nocera J.R. (2020). Correcting task fMRI signals for variability in baseline CBF improves BOLD-behavior relationships: A feasibility study in an aging model. *Frontiers in Neuroscience, 14*(336). doi: 10.3389/fnins.2020.00336

Drucker, J. H., Sathian, K., Crosson, B., Krishnamurthy, V., McGregor, K. M., Bozzorg, A., Gopinath, K., Krishnamurthy, L. C., Wolf, S., Hart, A. R., Evatt, M., & Corcos, D. M., & Hackney, M. E. (2019). Internally guided lower limb movement recruits compensatory cerebellar activity in Parkinson's disease. *Frontiers in Neurology*, *10*, 537.

Kashyap, A., Hackney, M., Krishnamurthy, V., Krishnamurthy, L., Sathian, K., Crosson, B., Wolf, S., Corcos, D., **Drucker, J.**, Evatt, M., Kaundinya, G., Bozzorg, A., & Hart, A. (2018). Neural correlates of externally Versus internally guided dance-based therapies for people with Parkinson's disease. *Journal of Clinical and Translational Science, 2(*S1), 21-21.

Crosson, B., McGregor, K. M., Nocera, J. R., **Drucker, J. H.**, & Butler, A. J. (2015). The relevance of aging-related changes in brain function to rehabilitation in aging-related disease. *Frontiers in Human Neuroscience, 9*(307).

Theses and dissertations

Drucker, J. H., Barrett, L. F., & Barsalou, L. W. (2016). Neural bases of core and conceptual self: Implications for the representation of other persons and groups of people [Doctoral dissertation].

Drucker, J. H., Wilson-Mendenhall, C. D., Barrett, L. F., & Barsalou, L. W. (2011). Establishing the neural bases of core and conceptual self [Master's Thesis].

CONFERENCE ORAL PRESENTATIONS & POSTERS

**First-author or senior-author talks accompanied by an asterisk*

*Erickson, I., Hidalgo, M., Reynolds, J., Krumholtz, V., Blacker, K., Burcal, C., Pettijohn, K., & **Drucker, J. H.** Proof-of-concept for a data-driven VR spatial disorientation training tool for Navy pilots. *67th Annual Meeting of the Human Factors and Ergonomics Society*. Washington, D.C., October 2023.

Roberts, S. R., Bohsali, A., Tran, S. M., **Drucker, J. H.**, Hirschmann, S., King, T. Z., Krishnamurthy, L. C., Krishnamurthy, V., Mareci, T., & Crosson, B. Cortico-striatal tractography: Structural connectivity of the left inferior frontal gyrus along the rostrocaudal length of the putamen. *40th Annual Conference of the Cognitive Science Society*. Quebec City, August 2018.

Drucker, J. H., Sathian, K., Crosson, B., McGregor, K. M., Krishnamurthy, L. C., Krishnamurthy, V., Bozzorg, A., Corcos, D. M., Wolf, S. L., & Hackney, M. E. Internally guided lower limb movement recruits compensatory cerebellar activity in Parkinson's disease (poster). *Annual Meeting of the Society for Neuroscience,* San Diego, November 2016.

***Drucker, J. H.**, McGregor, K. M., Epstein, C. M., & Crosson, B. Does right frontal activity help or hurt word retrieval?. *7th Annual Meeting of the Society for the Neurobiology of Language,* Chicago, October 2015.

***Drucker, J. H.**, Barsalou, L. W., & Barrett, L. F. Neural bases of core and conceptual self: Implications for the representation of other persons and groups of people. *Annual Meeting of the Society for Neuroscience*, Chicago, October 2015.

Gagnon, S. A., Olsen, R. K., **Drucker, J. H.**, Davidenko, N., & Wagner, A. D. Neural evidence for the role of attention in encoding precise memories. *21st Annual Cognitive Neuroscience Society Meeting*, San Francisco, March 2015.

Drucker, J. H. & Lourenco, S. F. Central-tendency bias is domain-general and dynamic (poster). *36th Annual Conference of the Cognitive Science Society*. Quebec City, July 2014.

Drucker, J. H., Wilson-Mendenhall, C., Barrett, L. F., & Barsalou, L. W. Neural representations of self and other: Beyond the default mode network (poster). *19th Annual Cognitive Neuroscience Society Meeting*, Chicago, April 2012.

Olsen, R. K., Wilson, J. K., Davidenko, N., **Drucker, J.**, Wagner, A. D. The influence of study-test perceptual similarity on recognition memory: A high-resolution fMRI study. *Annual Meeting of the Society for Neuroscience*, Chicago, October 2009.

Olsen, R. K., Davidenko, N., **Drucker, J. H.**, Wagner, A. D. The influence of study-test perceptual similarity on recognition memory: Behavioral and neural correlates of item memory strength. *Annual Meeting of the Society for Neuroscience*, Washington, DC, November 2008.